

Description

The invention relates to a locking device for a movable element which is pivotable relative to another element. More precisely, the invention concerns a locking device of the type defined in the preamble to claim 1. The invention especially relates to a locking device for a door having a door leaf which is hung in a door frame.

Relevant background art is disclosed in GB-A-2 127 089, which describes a lock including a solenoid-operated striker unit for capturing three pin-bolts of the shot bolt assembly of a key-operable locking mechanism of a hinged door. The pin-bolts are captured within a locking slide that slides up and down within a fixed channel or guide member between an upper, release position and a lower, locking position. The guide member is arranged perpendicular to the general pivoting plane of the door.

This known locking slide is axially movable within the guide member. In the locking position, the slide encloses the bolts and prevents the door from being opened. However, the slide does not provide any further locking engagement, which means that it can be tampered with from outside via the exposed recesses of the guide member. If considerable forces are applied to the locking slide, the locking action may be abolished by displacement of the slide.

The present invention aims at solving the problems and obviating the drawbacks as mentioned above. The main object of the present invention is therefore to provide a locking device which ensures a proper locking engagement of the bolt with the striking plate so as to prevent the lock from being forced open.

Another object is to make it possible to mount the lock mechanism in a Striking plate which has a small overall dimension and can be mounted in normal frames.

The invention also aims at providing a lock mechanism which even outside its locking position offers a high degree of security against being forced open.

According to the invention, the above objects are achieved in that the locking device mentioned by way of introduction further has the features stated in the characterising clause of claim 1.

Further objects and advantages as well as further characteristic features of the invention are stated in the following description and appended sub-claims.

The invention will now be described in detail, reference being had to the accompanying drawings which illustrate an embodiment.

Fig. 1 is a general view showing an application where a locking device according to the inven-

tion is being used.

Figs 2a and 2b are perspective views of a striking plate and a locking slide of the locking device, the two parts being shown separated.

Fig. 3 shows the locking slide in Fig. 2b positioned inside the striking plate and engaging a dog means;

Fig. 4 shows the locking slide in its locking position; and

Fig. 5 is a cross-section along line V-V in Fig. 4.

As shown in Fig. 1, the locking device according to the invention is used for e.g. a door 1 in a wall 2. A pin or bolt 3 which in this embodiment is fixed, projects from the longitudinal edge surface of a door leaf 4 which is in a half-opened position. A striking plate 5 comprises a lock mechanism which is in its opened position. A recess 6 is ready to receive the bolt 3. When the door is closed, i.e. the bolt 3 is inserted in the striking plate 5 mounted on a door frame 7, the lock mechanism can be activated from a control unit 8 via signalling wires 9.

Fig. 2b shows a locking slide 450 comprising two members, viz. a first member 451 connected with a rotatable guide screw 501 driven by a motor (not shown), and a second member 452 which is formed with an elongate projection 453 for engaging two grooves 150 (fig. 2a) connecting with the recess 6 of the striking plate 5. The two members 451, 452 of the locking slide 450 are connected with each other by means of a U-shaped link means 454.

The locking function of the two-piece locking slide 450 is shown in Figs. 3 and 4. The locking slide 450 is axially movable inside the striking plate 5 by rotation of the guide screw 501. In the locking position, the second member 452 of the locking slide 450 will first engage with a fixed dog means 600 formed on the striking plate 5, whereupon, when the guide screw 501 is rotated further, the member 452 is caused to move in a direction at right angles to the moving direction of the locking slide 450 in the striking plate 5. The movement of the second member 452 is effected by the link means 454 and by cams 455, 456 and, respectively, 457, 458 formed on the two members 451 and 452 of the locking slide 450 and coacting with each other. It will be appreciated that the locking slide 450 will be most safely locked in the final locking position as shown in Fig. 4, due to the engagement of the elongate projection 453 with the grooves 150 (see also Fig. 2a). Through this design, a most burglar-proof locking of the locking slide 450 is obtained in the locking position.

Fig. 5 is a cross-section of the striking plate 5 and the locking slide 450 positioned therein. The link means 454 is hingedly connected with the two members 451, 452 of the locking slide 450 by means of four guide pins 459. The size of the

locking slide 450 is accurately adapted to the space inside the striking plate 5 and with regard to the necessary clearance. According to another embodiment (not shown), a plate of hardened steel is attached to the outside of the locking slide leg which includes the projection 453. The hardened plate which is disposed between the inner wall of the striking plate and said leg, makes the locking device even more burglar-proof.

The lock mechanism mainly operates axially in the striking plate 5, i.e. in the longitudinal direction of the door frame 7, whereby the overall dimension, i.e. the depth to which the locking device extends in the frame, will be largely the same as for a normal striking plate, say, about 20-30 mm.

Substantially the entire overall dimension can be used to take up the bolt, whereby an excellent engagement of the bolt with the locking slide and thus satisfactory resistance to breaking open are obtained. When the described two-piece locking slide 450 is used, the locking device is made burglar-proof.

The driving means can be accomplished in various ways, such as by electric motors, piston-and-cylinder assemblies etc., or by combining different driving means. The locking device can therefore be operated both by remote control and on the spot.

The present invention relates to a locking device for general applications. The striking plate provided with the lock mechanism can thus be mounted in doors, gates, barriers, shutters etc. Furthermore, several locking devices can be mounted in the same door and need not even be mounted in the door frame. The material and dimensions of the locking device may be varied as required.

It should finally be pointed out that the invention is in no way restricted to the embodiments described above, but various modifications are conceivable within the scope of the inventive idea as defined in the appended claims.

It should further be mentioned that the linear displacement of the locking slide in the striking plate can be accomplished in different manners. The motor and the guide screw can be replaced by, for example, a pneumatically or hydraulically operated piston-and-cylinder assembly or the like.

Claims

1. A locking device for a movable element (4) which is pivotable relative to another element (7), one element having a projecting solid pin or an extensible bolt (3), while the other element comprises a striking plate (5) formed with a recess (6) into which the bolt/pin (3) is insertable, the striking plate (5) having a locking slide (450) which is U-shaped in cross-section

and which is guided and displaceable within and along the striking plate (5) substantially at right angles to the projecting direction of the bolt/pin (3) to a locking position in which the bolt/pin (3) is locked in the striking plate (5) by means of the locking slide (450) which encloses the bolt/pin (3) for locking the movable element (4), the locking device further including a driving means (501) connected with the locking slide (450) so as to provide said displacement thereof, the driving means (501) and the locking slide (450) being mounted inside the striking plate (5), characterised in that the locking slide (450) comprises two interconnected members (451, 452) of which a first one (451) is connected with the driving means (501) while a second one (452) is, in the locking position, movable substantially at right angles to the moving direction of the locking slide (450) by camming means between the two members (451, 452) of the locking slide (450), the second member (452) being moved into engagement with an edge portion (150) of the recess (6) of the striking plate (5) for longitudinal locking of the slide (450) in the locking position.

2. A locking device as claimed in claim 1, wherein a fixed dog means (600) is arranged inside the striking plate (5), the second member (452) of the locking slide (450) being engaged with the dog means (600) in the locking position in order to provide said movement of the second member (452) of the locking slide (450).
3. A locking device as claimed in claim 1 or 2, wherein the second member (452) of the locking slide (450) has a projection (453) which, in the locking position, is movable by said movement into engagement with grooves (150) connecting with the recess (6) of the striking plate (5).
4. A locking device as claimed in claim 3, wherein the two members (451, 452) of the locking slide (450) have cam surfaces (455-458) coacting with each other so as to move the second member (452) of the locking slide (450) into engagement with the grooves (150).
5. The locking device as claimed in any one of the preceding claims, wherein the driving means comprises a guide screw (501) which is rotatable by means of a motor and which engages and extends through a threaded hole in the locking slide (450).

Patentansprüche

1. Verriegelungsvorrichtung für ein bewegliches Element (4), das in bezug auf ein anderes Element (7) drehbar ist, wobei ein Element einen vorstehenden massiven Bolzen oder einen ausfahrbaren Riegel (3) aufweist, während das andere Element ein Schließblech (5) umfaßt, das mit einer Aussparung (6) versehen ist, in die der Riegel/Bolzen (3) eingeführt werden kann, wobei das Schließblech (5) einen Verriegelungsschieber (450) hat, der im Querschnitt U-förmig ist und im wesentlichen im rechten Winkel zur Vorsteherichtung des Riegels/Bolzen (3) in dem Schließblech (5) geführt und darin und an ihm entlang in eine Verriegelungsstellung verschoben wird, in der der Riegel/Bolzen (3) in dem Schließblech (5) mittels des Verriegelungsschiebers (450) verriegelt ist, der den Riegel/Bolzen (3) umgibt, um so das bewegliche Element (4) zu verriegeln, wobei die Verriegelungsvorrichtung des weiteren eine Antriebseinrichtung (501) enthält, die mit dem Verriegelungsschieber (450) verbunden ist, um die Verschiebung desselben zu ermöglichen, wobei die Antriebseinrichtung (501) und der Verriegelungsschieber (450) im Inneren des Schließblechs (5) angebracht sind, **dadurch gekennzeichnet**, daß der Verriegelungsschieber (450) zwei miteinander verbundene Elemente (451, 452) umfaßt, von denen ein erstes (451) mit der Antriebseinrichtung (501) verbunden ist, während ein zweites (452) in der Verriegelungsstellung durch Kurveneinrichtungen zwischen den beiden Elementen (451, 452) des Verriegelungsschiebers (450) im wesentlichen im rechten Winkel zur Bewegungsrichtung des Verriegelungsschiebers (450) beweglich ist, wobei das zweite Element (452) mit einem Kantenabschnitt (150) der Aussparung (6) des Schließblechs (5) in Eingriff bewegt wird, um den Schieber (450) in Längsrichtung in der Verriegelungsposition zu verriegeln.
2. Verriegelungsvorrichtung nach Anspruch 1, wobei eine stationäre Anschlagseinrichtung (600) in dem Schließblech (5) angeordnet ist, wobei das zweite Element (452) des Verriegelungsschiebers (450) in der Verriegelungsposition mit der Anschlagseinrichtung (600) in Kontakt ist, um die Bewegung des zweiten Elementes (452) des Verriegelungsschiebers (450) zu ermöglichen.
3. Verriegelungsvorrichtung nach Anspruch 1 oder 2, wobei das zweite Element (452) des Verriegelungsschiebers (450) einen Vorsprung (453) aufweist, der in der Verriegelungsposition

durch die Bewegung mit Nuten (150), die mit der Aussparung (6) des Schließbleches (5) verbunden sind, in Eingriff bewegt werden kann.

4. Verriegelungsvorrichtung nach Anspruch 3, wobei die beiden Elemente (451, 452) des Verriegelungsschiebers (450) Kurvenflächen (455-458) aufweisen, die miteinander zusammenwirken, um so das zweite Element (452) des Verriegelungsschiebers (450) mit den Nuten (150) in Eingriff zu bewegen.
5. Verriegelungsvorrichtung nach einem der vorhergehenden Ansprüche, wobei die Antriebseinrichtung eine Führungsspindel (501) umfaßt, die mittels eines Motors drehbar ist, und die mit einem mit Gewinde versehenen Loch in dem Verriegelungsschieber (450) in Eingriff ist und durch selbiges verläuft.

Revendications

1. Dispositif de verrouillage pour un élément mobile (4) qui peut pivoter par rapport à un autre élément (7), l'un des éléments ayant un tenon massif en saillie ou un pêne extensible (3), tandis que l'autre élément comprend une plaque de gâche (5) munie d'une encoche (6) dans laquelle le pêne ou tenon (3) peut s'engager, la plaque de gâche (5) possédant un coulisseau de verrouillage (450) qui est en forme de U en section transversale et qui est guidé dans la plaque de gâche (5) et peut se déplacer le long de cette plaque, sensiblement perpendiculairement à la direction de la projection du pêne ou tenon (3), pour prendre une position de verrouillage dans laquelle le pêne ou tenon (3) est verrouillé dans la plaque de gâche (5) au moyen du coulisseau de verrouillage (450) qui enferme le tenon ou pêne (3) pour verrouiller l'élément mobile (4), le dispositif de verrouillage comprenant en outre un moyen d'entraînement (501) relié au coulisseau de verrouillage (450) de manière à commander le déplacement de ce coulisseau, le moyen d'entraînement (501) et le coulisseau de verrouillage (450) étant montés à l'intérieur de la plaque de gâche (5), caractérisé en ce que le coulisseau de verrouillage (450) comprend deux éléments (451, 452) interconnectés, dont un premier (451) est relié au moyen d'entraînement (501) tandis que, dans la position de verrouillage, un deuxième (452) peut se déplacer sensiblement perpendiculairement à la direction du déplacement du coulisseau de verrouillage (450), sous l'action de moyens à effet de came agissant entre les deux éléments (451, 452) du coulisseau de verrouillage

(450), le deuxième élément (452) étant mis en prise avec une partie de bord (150) de l'encoche (6) de la plaque de gâche (5) pour assurer le verrouillage longitudinal du coulisseau (450) dans la position de verrouillage.

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2. Dispositif de verrouillage selon la revendication 1, dans lequel un moyen formant taquet fixe (600) est agencé à l'intérieur de la plaque de gâche (5), le deuxième élément (452) du coulisseau de verrouillage (450) étant en appui contre le moyen formant taquet (600) dans la position de verrouillage, afin de commander ledit mouvement du deuxième élément (452) du coulisseau de verrouillage (450). 10 15
3. Dispositif de verrouillage selon la revendication 1 ou 2, dans lequel le deuxième élément (452) du coulisseau de verrouillage (450) possède une saillie (453) qui, dans la position de verrouillage, peut être placée par ledit mouvement en prise avec des gorges (150) qui communiquent avec l'encoche (6) de la plaque de gâche (5). 20 25
4. Dispositif de verrouillage selon la revendication 3, dans lequel les deux éléments (451, 452) du coulisseau de verrouillage (450) ont des surfaces de cames (455-458) qui coopèrent entre elles de manière à mettre le deuxième élément (452) du coulisseau de verrouillage (450) en prise avec les gorges (150). 30
5. Dispositif de verrouillage selon une quelconque des revendications précédentes, dans lequel le moyen d'entraînement comprend une vis de translation (501) qui peut être mise en rotation au moyen d'un moteur et qui est vissée dans un trou fileté du coulisseau de verrouillage (450) et traverse ce trou fileté. 35 40

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